



SEQUENCE LISTING

<110> FELDER, ROBIN A.
JOSE, PEDRO

<120> G PROTEIN-RELATED KINASE MUTANTS IN ESSENTIAL
HYPERTENSION

<130> FELDER 3.9-001 CONT DIV

<140> 10/677,983

<141> 2003-10-02

<150> 09/614,748

<151> 2000-07-12

<150> PCT/US99/00663

<151> 1999-01-12

<150> 60/071,199

<151> 1998-01-12

<150> 60/098,279

<151> 1998-08-28

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<170> PatentIn Ver. 2.1

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35 40 45

Ile Glu Lys Asp Tyr Ser Ser Leu Cys Asp Lys Gln Pro Ile Gly Arg
50 55 60

Arg Leu Phe Arg Gln Phe Cys Asp Thr Lys Pro Thr Leu Lys Arg His
65 70 75 80

Ile Glu Phe Leu Asp Ala Val Ala Glu Tyr Glu Val Ala Asp Asp Glu
85 90 95

Asp Arg Ser Asp Cys Gly Leu Ser Ile Leu Asp Arg Phe Phe Asn Asp
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Lys Leu Ala Ala Pro Leu Pro Glu Ile Pro Pro Asp Val Val Thr Glu
115 120 125

Cys	Arg	Leu	Gly	Leu	Lys	Glu	Glu	Asn	Pro	Ser	Lys	Lys	Ala	Phe	Glu	130	135	140
Glu	Cys	Thr	Arg	Val	Ala	His	Asn	Tyr	Leu	Arg	Gly	Glu	Pro	Phe	Glu	145	150	155
Glu	Tyr	Gln	Glu	Ser	Ser	Tyr	Phe	Ser	Gln	Phe	Leu	Gln	Trp	Lys	Trp	165	170	175
Leu	Glu	Arg	Gln	Pro	Val	Thr	Lys	Asn	Thr	Phe	Arg	His	Tyr	Arg	Val	180	185	190
Leu	Gly	Lys	Gly	Gly	Phe	Gly	Glu	Val	Cys	Ala	Cys	Gln	Val	Arg	Ala	195	200	205
Thr	Gly	Lys	Met	Tyr	Ala	Cys	Lys	Lys	Leu	Gln	Lys	Lys	Arg	Ile	Lys	210	215	220
Lys	Arg	Lys	Gly	Glu	Ala	Met	Ala	Leu	Asn	Glu	Lys	Arg	Ile	Leu	Glu	225	230	235
Lys	Val	Gln	Ser	Arg	Phe	Val	Val	Ser	Leu	Ala	Tyr	Ala	Tyr	Glu	Thr	245	250	255
Lys	Asp	Ala	Leu	Cys	Leu	Val	Leu	Thr	Ile	Met	Asn	Gly	Gly	Asp	Leu	260	265	270
Lys	Phe	His	Ile	Tyr	Asn	Leu	Gly	Asn	Pro	Gly	Phe	Asp	Glu	Gln	Arg	275	280	285
Ala	Val	Phe	Tyr	Ala	Ala	Glu	Leu	Cys	Cys	Gly	Leu	Glu	Asp	Leu	Gln	290	295	300
Arg	Glu	Arg	Ile	Val	Tyr	Arg	Asp	Leu	Lys	Pro	Glu	Asn	Ile	Leu	Leu	305	310	315
Asp	Asp	Arg	Gly	His	Ile	Arg	Ile	Ser	Asp	Leu	Gly	Leu	Ala	Thr	Glu	325	330	335
Ile	Pro	Glu	Gly	Gln	Arg	Val	Arg	Gly	Arg	Val	Gly	Thr	Val	Gly	Tyr	340	345	350
Met	Ala	Pro	Glu	Val	Val	Asn	Asn	Glu	Lys	Tyr	Thr	Phe	Ser	Pro	Asp	355	360	365
Trp	Trp	Gly	Leu	Gly	Cys	Leu	Ile	Tyr	Glu	Met	Ile	Gln	Gly	His	Ser	370	375	380
Pro	Phe	Lys	Lys	Tyr	Lys	Glu	Lys	Val	Lys	Trp	Glu	Glu	Val	Asp	Gln	385	390	395
Arg	Ile	Lys	Asn	Asp	Thr	Glu	Glu	Tyr	Ser	Glu	Lys	Phe	Ser	Glu	Asp	405	410	415
Ala	Lys	Ser	Ile	Cys	Arg	Met	Leu	Leu	Thr	Lys	Asn	Pro	Ser	Lys	Arg	420	425	430

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 450 455 460
 Pro Phe Cys Pro Asp Pro His Ala Val Tyr Cys Lys Asp Val Leu Asp
 465 470 475 480
 Ile Glu Gln Phe Ser Ala Val Lys Gly Ile Tyr Leu Asp Thr Ala Asp
 485 490 495
 Glu Asp Phe Tyr Ala Arg Phe Ala Thr Gly Cys Val Ser Ile Pro Trp
 500 505 510
 Gln Asn Glu Met Ile Glu Ser Gly Cys Phe Lys Asp Ile Asn Lys Ser
 515 520 525
 Glu Ser Glu Glu Ala Leu Pro Leu Asp Leu Asp Lys Asn Ile His Thr
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 <213> Homo sapiens

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 35 40 45
 Ile Glu Phe Leu Asp Ala Val Ala Glu Tyr Glu Val Ala Asp Asp Glu
 50 55 60
 Asp Arg Ser Asp Cys Gly Leu Ser Ile Leu Asp Arg Phe Phe Asn Asp
 65 70 75 80
 Lys Leu Ala Ala Pro Leu Pro Glu Ile Pro Pro Asp Val Val Thr Glu
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 Cys Arg Leu Gly Leu Lys Glu Glu Asn Pro Ser Lys Lys Ala Phe Glu
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Glu Cys Thr Arg Val Ala His Asn Tyr Leu Arg Gly Glu Pro Phe Glu
 115 120 125
 Glu Tyr Gln Glu Ser Ser Tyr Phe Ser Gln Phe Leu Gln Trp Lys Trp
 130 135 140
 Leu Glu Arg Gln Pro Val Thr Lys Asn Thr Phe Arg His Tyr Arg Val
 145 150 155 160
 Leu Gly Lys Gly Gly Phe Gly Glu Val Cys Ala Cys Gln Val Arg Ala
 165 170 175
 Thr Gly Lys Met Tyr Ala Cys Lys Lys Leu Gln Lys Lys Arg Ile Lys
 180 185 190
 Lys Arg Lys Gly Glu Ala Met Ala Leu Asn Glu Lys Arg Ile Leu Glu
 195 200 205
 Lys Val Gln Ser Arg Phe Val Val Ser Leu Ala Tyr Ala Tyr Glu Thr
 210 215 220
 Lys Asp Ala Leu Cys Leu Val Leu Thr Ile Met Asn Gly Gly Asp Leu
 225 230 235 240
 Lys Phe His Ile Tyr Asn Leu Gly Asn Pro Gly Phe Asp Glu Gln Arg
 245 250 255
 Ala Val Phe Tyr Ala Ala Glu Leu Cys Cys Gly Leu Glu Asp Leu Gln
 260 265 270
 Arg Glu Arg Ile Val Tyr Arg Asp Leu Lys Pro Glu Asn Ile Leu Leu
 275 280 285
 Asp Asp Arg Gly His Ile Arg Ile Ser Asp Leu Gly Leu Ala Thr Glu
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 Ile Pro Glu Gly Gln Arg Val Arg Gly Arg Val Gly Thr Val Gly Tyr
 305 310 315 320
 Met Ala Pro Glu Val Val Asn Asn Glu Lys Tyr Thr Phe Ser Pro Asp
 325 330 335
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 340 345 350
 Pro Phe Lys Lys Tyr Lys Glu Lys Val Lys Trp Glu Glu Val Asp Gln
 355 360 365
 Arg Ile Lys Asn Asp Thr Glu Glu Tyr Ser Glu Lys Phe Ser Glu Asp
 370 375 380
 Ala Lys Ser Ile Cys Arg Met Leu Leu Thr Lys Asn Pro Ser Lys Arg
 385 390 395 400
 Leu Gly Cys Arg Gly Glu Gly Ala Ala Gly Val Lys Gln His Pro Val
 405 410 415

Phe Lys Asp Ile Asn Phe Arg Arg Leu Glu Ala Asn Met Leu Glu Pro
 420 425 430
 Pro Phe Cys Pro Asp Pro His Ala Val Tyr Cys Lys Asp Val Leu Asp
 435 440 445
 Ile Glu Gln Phe Ser Ala Val Lys Gly Ile Tyr Leu Asp Thr Ala Asp
 450 455 460
 Glu Asp Phe Tyr Ala Arg Phe Ala Thr Gly Cys Val Ser Ile Pro Trp
 465 470 475 480
 Gln Asn Glu Met Ile Glu Ser Gly Cys Phe Lys Asp Ile Asn Lys Ser
 485 490 495
 Glu Ser Glu Glu Ala Leu Pro Leu Asp Leu Asp Lys Asn Ile His Thr
 500 505 510
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 Gln Cys
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 35 40 45
 Ile Glu Lys Asp Tyr Ser Ser Leu Cys Asp Lys Gln Pro Ile Gly Arg
 50 55 60
 Arg Leu Phe Arg Gln Phe Cys Asp Thr Lys Pro Ile Leu Lys Arg His
 65 70 75 80
 Ile Glu Phe Leu Asp Ala Val Ala Glu Tyr Glu Val Ala Asp Asp Glu
 85 90 95
 Asp Arg Ser Asp Cys Gly Leu Ser Ile Leu Asp Arg Phe Phe Asn Asp
 100 105 110
 Lys Leu Ala Ala Pro Leu Pro Glu Ile Pro Pro Asp Val Val Thr Glu
 115 120 125

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Asp	Asp	Arg	Gly	His	Ile	Arg	Ile	Ser	Asp	Leu	Gly	Leu	Ala	Thr	Glu	
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Ile	Pro	Glu	Gly	Gln	Arg	Val	Arg	Gly	Arg	Val	Gly	Thr	Val	Gly	Tyr	
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Met	Ala	Pro	Glu	Val	Val	Asn	Asn	Glu	Lys	Tyr	Thr	Phe	Ser	Pro	Asp	
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	370					375					380					
Pro	Phe	Lys	Lys	Tyr	Lys	Glu	Lys	Val	Lys	Trp	Glu	Glu	Val	Asp	Gln	
385					390					395					400	
Arg	Ile	Lys	Asn	Asp	Thr	Glu	Glu	Tyr	Ser	Glu	Lys	Phe	Ser	Glu	Asp	
				405					410					415		
Ala	Lys	Ser	Ile	Cys	Arg	Met	Leu	Leu	Thr	Lys	Asn	Pro	Ser	Lys	Arg	
			420					425					430			

Leu Gly Cys Arg Gly Glu Gly Ala Ala Gly Val Lys Gln His Pro Val
 435 440 445
 Phe Lys Asp Ile Asn Phe Arg Arg Leu Glu Ala Asn Met Leu Glu Pro
 450 455 460
 Pro Phe Cys Pro Asp Pro His Ala Val Tyr Cys Lys Asp Val Leu Asp
 465 470 475 480
 Ile Glu Gln Phe Ser Ala Val Lys Gly Ile Tyr Leu Asp Thr Ala Asp
 485 490 495
 Glu Asp Phe Tyr Ala Arg Phe Ala Thr Gly Cys Val Ser Ile Pro Trp
 500 505 510
 Gln Asn Glu Gly Cys Leu Thr Met Val Pro Ser Glu Lys Glu Val Glu
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 Pro Lys Gln Cys
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<210> 4
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 <212> PRT
 <213> Homo sapiens

<400> 4
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 Arg Leu Phe Arg Gln Phe Cys Asp Thr Lys Pro Thr Leu Lys Arg His
 35 40 45
 Ile Glu Phe Leu Asp Ala Val Ala Glu Tyr Glu Val Ala Asp Asp Glu
 50 55 60
 Asp Arg Ser Asp Cys Gly Leu Ser Ile Leu Asp Arg Phe Phe Asn Asp
 65 70 75 80
 Lys Leu Ala Ala Pro Leu Pro Glu Ile Pro Pro Asp Val Val Thr Glu
 85 90 95
 Cys Arg Leu Gly Leu Lys Glu Glu Asn Pro Ser Lys Lys Ala Phe Glu
 100 105 110
 Glu Cys Thr Arg Val Ala His Asn Tyr Leu Arg Gly Glu Pro Phe Glu
 115 120 125
 Glu Tyr Gln Glu Ser Ser Tyr Phe Ser Gln Phe Leu Gln Trp Lys Trp
 130 135 140
 Leu Glu Arg Gln Pro Val Thr Lys Asn Thr Phe Arg His Tyr Arg Val
 145 150 155 160

Leu Gly Lys Gly Gly Phe Gly Glu Val Cys Ala Cys Gln Val Arg Ala
 165 170 175
 Thr Gly Lys Met Tyr Ala Cys Lys Lys Leu Gln Lys Lys Arg Ile Lys
 180 185 190
 Lys Arg Lys Gly Glu Ala Met Ala Leu Asn Glu Lys Arg Ile Leu Glu
 195 200 205
 Lys Val Gln Ser Arg Phe Val Val Ser Leu Ala Tyr Ala Tyr Glu Thr
 210 215 220
 Lys Asp Ala Leu Cys Leu Val Leu Thr Ile Met Asn Gly Gly Asp Leu
 225 230 235 240
 Lys Phe His Ile Tyr Asn Leu Gly Asn Pro Gly Phe Asp Glu Gln Arg
 245 250 255
 Ala Val Phe Tyr Ala Ala Glu Leu Cys Cys Gly Leu Glu Asp Leu Gln
 260 265 270
 Arg Glu Arg Ile Val Tyr Arg Asp Leu Lys Pro Glu Asn Ile Leu Leu
 275 280 285
 Asp Asp Arg Gly His Ile Arg Ile Ser Asp Leu Gly Leu Ala Thr Glu
 290 295 300
 Ile Pro Glu Gly Gln Arg Val Arg Gly Arg Val Gly Thr Val Gly Tyr
 305 310 315 320
 Met Ala Pro Glu Val Val Asn Asn Glu Lys Tyr Thr Phe Ser Pro Asp
 325 330 335
 Trp Trp Gly Leu Gly Cys Leu Ile Tyr Glu Met Ile Gln Gly His Ser
 340 345 350
 Pro Phe Lys Lys Tyr Lys Glu Lys Val Lys Trp Glu Glu Val Asp Gln
 355 360 365
 Arg Ile Lys Asn Asp Thr Glu Glu Tyr Ser Glu Lys Phe Ser Glu Asp
 370 375 380
 Ala Lys Ser Ile Cys Arg Met Leu Leu Thr Lys Asn Pro Ser Lys Arg
 385 390 395 400
 Leu Gly Cys Arg Gly Glu Gly Ala Ala Gly Val Lys Gln His Pro Val
 405 410 415
 Phe Lys Asp Ile Asn Phe Arg Arg Leu Glu Ala Asn Met Leu Glu Pro
 420 425 430
 Pro Phe Cys Pro Asp Pro His Ala Val Tyr Cys Lys Asp Val Leu Asp
 435 440 445
 Ile Glu Gln Phe Ser Ala Val Lys Gly Ile Tyr Leu Asp Thr Ala Asp
 450 455 460

Glu Asp Phe Tyr Ala Arg Phe Ala Thr Gly Cys Val Ser Ile Pro Trp
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Gln Asn Glu Gly Cys Leu Thr Met Val Pro Ser Glu Lys Glu Val Glu
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Pro Lys Gln Cys
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<213> Homo sapiens

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Ile Leu Thr Leu Pro Pro Val Ser Gln Cys Ser Glu Leu Arg His Ser
 35 40 45

Ile Glu Lys Asp Tyr Ser Ser Leu Cys Asp Lys Gln Pro Ile Gly Arg
 50 55 60

Arg Leu Phe Arg Gln Phe Cys Asp Thr Lys Pro Thr Leu Lys Arg His
 65 70 75 80

Ile Glu Phe Leu Asp Ala Val Ala Glu Tyr Glu Val Ala Asp Asp Glu
 85 90 95

Asp Arg Ser Asp Cys Gly Leu Ser Ile Leu Asp Arg Phe Phe Asn Asp
 100 105 110

Lys Leu Ala Ala Pro Leu Pro Glu Ile Pro Pro Asp Val Val Thr Glu
 115 120 125

Cys Arg Leu Gly Leu Lys Glu Glu Asn Pro Ser Lys Lys Ala Phe Glu
 130 135 140

Glu Cys Thr Arg Val Ala His Asn Tyr Leu Arg Gly Glu Pro Phe Glu
 145 150 155 160

Glu Tyr Gln Glu Ser Ser Tyr Phe Ser Gln Phe Leu Gln Trp Lys Trp
 165 170 175

Leu Glu Arg Gln Pro Val Thr Lys Asn Thr Phe Arg His Tyr Arg Val
 180 185 190

Leu Gly Lys Gly Gly Phe Gly Glu Val Cys Ala Cys Gln Val Arg Ala
 195 200 205

Thr Gly Lys Met Tyr Ala Cys Lys Lys Leu Gln Lys Lys Arg Ile Lys
 210 215 220

Lys Arg Lys Gly Glu Ala Met Ala Leu Asn Glu Lys Arg Ile Leu Glu
 225 230 235 240
 Lys Val Gln Ser Arg Phe Val Val Ser Leu Ala Tyr Ala Tyr Glu Thr
 245 250 255
 Lys Asp Ala Leu Cys Leu Val Leu Thr Ile Met Asn Gly Gly Asp Leu
 260 265 270
 Lys Phe His Ile Tyr Asn Leu Gly Asn Pro Gly Phe Asp Glu Gln Arg
 275 280 285
 Ala Val Phe Tyr Ala Ala Glu Leu Cys Cys Gly Leu Glu Asp Leu Gln
 290 295 300
 Arg Glu Arg Ile Val Tyr Arg Asp Leu Lys Pro Glu Asn Ile Leu Leu
 305 310 315 320
 Asp Asp Arg Gly His Ile Arg Ile Ser Asp Leu Gly Leu Ala Thr Glu
 325 330 335
 Ile Pro Glu Gly Gln Arg Val Arg Gly Arg Val Gly Thr Val Gly Tyr
 340 345 350
 Met Ala Pro Glu Val Val Asn Asn Glu Lys Tyr Thr Phe Ser Pro Asp
 355 360 365
 Trp Trp Gly Leu Gly Cys Leu Ile Tyr Glu Met Ile Gln Gly His Ser
 370 375 380
 Pro Phe Lys Lys Tyr Lys Glu Lys Val Lys Trp Glu Glu Val Asp Gln
 385 390 395 400
 Arg Ile Lys Asn Asp Thr Glu Glu Tyr Ser Glu Lys Phe Ser Glu Asp
 405 410 415
 Ala Lys Ser Ile Cys Arg Met Pro His Ala Val Tyr Cys Lys Asp Val
 420 425 430
 Leu Asp Ile Glu Gln Phe Ser Ala Val Lys Gly Ile Tyr Leu Asp Thr
 435 440 445
 Ala Asp Glu Asp Phe Tyr Ala Arg Phe Ala Thr Gly Cys Val Ser Ile
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 Val Glu Pro Lys Gln Cys
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<213> Homo sapiens

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Ile	Glu	Phe	Leu	Asp	Ala	Val	Ala	Glu	Tyr	Glu	Val	Ala	Asp	Asp	Glu
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Asp	Arg	Ser	Asp	Cys	Gly	Leu	Ser	Ile	Leu	Asp	Arg	Phe	Phe	Asn	Asp
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Lys	Leu	Ala	Ala	Pro	Leu	Pro	Glu	Ile	Pro	Pro	Asp	Val	Val	Thr	Glu
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Cys	Arg	Leu	Gly	Leu	Lys	Glu	Glu	Asn	Pro	Ser	Lys	Lys	Ala	Phe	Glu
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Glu	Cys	Thr	Arg	Val	Ala	His	Asn	Tyr	Leu	Arg	Gly	Glu	Pro	Phe	Glu
		115					120					125			
Glu	Tyr	Gln	Glu	Ser	Ser	Tyr	Phe	Ser	Gln	Phe	Leu	Gln	Trp	Lys	Trp
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Lys	Val	Gln	Ser	Arg	Phe	Val	Val	Ser	Leu	Ala	Tyr	Ala	Tyr	Glu	Thr
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Lys	Phe	His	Ile	Tyr	Asn	Leu	Gly	Asn	Pro	Gly	Phe	Asp	Glu	Gln	Arg
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Ala	Val	Phe	Tyr	Ala	Ala	Glu	Leu	Cys	Cys	Gly	Leu	Glu	Asp	Leu	Gln
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Arg	Glu	Arg	Ile	Val	Tyr	Arg	Asp	Leu	Lys	Pro	Glu	Asn	Ile	Leu	Leu
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Asp	Asp	Arg	Gly	His	Ile	Arg	Ile	Ser	Asp	Leu	Gly	Leu	Ala	Thr	Glu
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Ile Pro Glu Gly Gln Arg Val Arg Gly Arg Val Gly Thr Val Gly Tyr
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 Met Ala Pro Glu Val Val Asn Asn Glu Lys Tyr Thr Phe Ser Pro Asp
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 Trp Trp Gly Leu Gly Cys Leu Ile Tyr Glu Met Ile Gln Gly His Ser
 340 345 350
 Pro Phe Lys Lys Tyr Lys Glu Lys Val Lys Trp Glu Glu Val Asp Gln
 355 360 365
 Arg Ile Lys Asn Asp Thr Glu Glu Tyr Ser Glu Lys Phe Ser Glu Asp
 370 375 380
 Ala Lys Ser Ile Cys Arg Met Pro His Ala Val Tyr Cys Lys Asp Val
 385 390 395 400
 Leu Asp Ile Glu Gln Phe Ser Ala Val Lys Gly Ile Tyr Leu Asp Thr
 405 410 415
 Ala Asp Glu Asp Phe Tyr Ala Arg Phe Ala Thr Gly Cys Val Ser Ile
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<211> 2113

<212> DNA

<213> Homo sapiens

<400> 7

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<210> 8

<211> 2017

<212> DNA

<213> Homo sapiens

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<210> 9
 <211> 1975
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 <212> DNA
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<210> 12
<211> 1305

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<212> DNA

<213> Homo sapiens

<400> 12

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<210> 13

<211> 28

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: GRK4 Primer

<400> 13

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<210> 14

<211> 28

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: GRK4 Primer

<400> 14

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28

<210> 15

<211> 21

<212> DNA

<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: GRK4 Primer

<400> 15
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<210> 16
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: GRK4 Primer

<400> 16
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<210> 17
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: GRK4 Primer

<400> 17
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<210> 18
<211> 19
<212> DNA
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<220>
<223> Description of Artificial Sequence: GRK4 Primer

<400> 18
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<210> 19
<211> 28
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<220>
<223> Description of Artificial Sequence: GRK4 Primer

<400> 19
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<210> 20
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 <212> DNA
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<220>
 <223> Description of Artificial Sequence: GRK4 Primer

<400> 20
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<220>
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<210> 22
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<220>
 <223> Description of Artificial Sequence: GRK4 Primer

<400> 22
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<210> 23
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<220>
 <223> Description of Artificial Sequence: GRK4 allele
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<400> 23
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<210> 24
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<220>
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<400> 24
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<210> 25
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<220>
<223> Description of Artificial Sequence: GRK4 allele
specific oligonucleotide

<400> 25
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<210> 26
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<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: GRK4 allele
specific oligonucleotide

<400> 26
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19

<210> 27
<211> 19
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: GRK4 allele
specific oligonucleotide

<400> 27
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19

<210> 28
<211> 19
<212> DNA
<213> Artificial Sequence

<220>
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specific oligonucleotide

<400> 28
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<210> 29
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 specific oligonucleotide

<400> 29
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<210> 30
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<400> 30
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<210> 31
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<220>
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<400> 31
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<210> 32
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<220>
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<400> 32
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<210> 33
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<220>
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<400> 33
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<210> 34
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: antisense
oligonucleotide

<400> 34
ctccatgtcc tggcgccg

18